The Four Big Reasons for Contribution to Open Educational Resources

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Abstract: Volunteers contribute their efforts and time into organizations for different reasons and goals. These goals include strengthening their experience, developing networks, and enhancing their feelings. Similarly, programmers to Open Source Software (OSS) contribute programming to experience programming, develop their career future, and make software freely available for users. The rapid increase in contributing learning materials to Open Educational Resources (OERs) raises the question of what are the possible reasons that inspire OER contributors to write to these repositories. A web-based survey was published on Wikibooks website to assess the different reasons for contribution to OERs. After applying factor analysis to the sample (N=145), four reasons of contribution to OERs emerged. These results were discussed in relation to the Volunteer Functions Inventory (VFI) and motivation to contribute or not to open source/content.

Key words: Open educational resources (OERs), Wikibooks, motivation.

Introduction

Many individuals decide to expend effort and part of their time in mostly 'unpaid' work. Many researchers have tried to answer the question of why they do this, in different fields and, within different organizations. Each individual has a unique set of motivational needs. However, cognitive variables play a significant role in the 'motivation-action sequence' (McClelland, 1967). A long standing perspective to the study of motivation is expectancy-value theory. Theorists, such as Atkinson (1957) and Eccles, et al. (1983) argue that an individual's choice and performance can be explained by their beliefs and expectations. Deci & Ryan (1985) have assessed a value of interest as a construct of intrinsic motivation. Eccles, et al. (1983) have found that there is positive relationship between competence-related beliefs and values, which has

indirect effects on achievement outcomes. However, outcomes themselves can also be conceived of as values that people seek to achieve. For example, goals and values within the hierarchy of the self (Carver & Scheier, 2000) indicate that individuals give relative values to their goals. The previous mentioned studies of goal theory share the same theme: an individuals' behaviour is purposeful and an individual seek to satisfy his/her needs. However, what makes people spend their time and efforts to help others? The benefits of understanding motivation for volunteering are very significant for organizations to be able to attract potential volunteers by tailoring recruitment messages to meet as closely as possible individuals' desired activities (Esmond & Dunlop, 2004).

Literature Review

Anderson & Moore (1978) found that volunteers' motives were: 1) helping others; 2) feeling useful and needed; 3) self-fulfilment; 4) personal development; 5) improving the community; 6) using of spare time; 7) meeting people; 8) gaining work-related experience; 9) meeting or building up friends; and 10) companionship. These motivations to volunteer can be theoretically constructed into two categories: self-oriented which include feel-needed, self-fulfilment, personal development, gain experience, and use of spare time; and others-oriented motivations include help others, improve the community, meet people, friends, and companionship. Indeed, volunteering can carry many of the same benefits for individuals as paid work. Unpaid work (volunteering) can benefit individuals with sources of identity, friends, meaning and satisfaction. Perhaps, the only difference between volunteering and paid work is money paid and received as an obvious difference between paid and unpaid work (Metzer, 2006).

Clary, et al.(1998) in their paper introduced a new instrument called the Volunteer Functions Inventory (VFI). They argued that volunteering can serve different functions: 1) volunteers may express 'values' related to humanitarian and altruistic concerns toward others; 2) volunteering gives the chance to gain more 'understanding' by self development and learning; 3) volunteering offers individuals to interact with their friends and gain new friends thereby gaining 'social' rewards; 4) volunteering allows individuals to gain 'career' related benefits; 5) volunteering retains 'protective' functions such as reducing feeling of guilt or escaping from negative feelings; and 6) functions that serve for more ego 'enhancement' such as those who help others to gain positive effects.

Volunteering to open source software and open content

Linux and Wikipedia are famous examples of open source software and open content webpages respectively. Open source software can be defined as software whose source code is open for programmers to edit, develop, customize, distribute and reuse. Open content webpages are webpages that allow internet users to add, edit and delete their contents.

Contributing to Open Source Software (OSS)

Why do programmers work without remuneration in open source software? While Stallman (1999) has argued that most programmers in open source software enjoy programming and believe that software should be free, Hars & Ou (2001) found that programmers in open source software were defined themselves as 1) unpaid programmers that include students and hobbyists; 2) salaried programmers who worked as programmers for other organizations; and 3) paid programmers who are paid for their open source development. Hars & Ou (2001) further argued that motivation for contributing to OSS is complex: they found that, unexpectedly, external factors such as human capital and self-marketing that involve promises for monetary rewards in the future are of higher weight than intrinsic motivation which includes self-determination, altruism, and community belonging. Although Hars & Ou (2001) also found that external motives weigh more for programmers in OSS, Bitzer, Schrettl, & Schröder (2005) found that intrinsic motives, such as programmers' actual needs of software, fun of programming and/or enjoying the challenge, and the desire of belonging to the gift OSS society, played a significant role in a dynamic private-provision-of-public-goods model. In other words, programmers will contribute to OSS at

'maximum' speed if they gain from using the software, obtain a benefit, and enjoy the play and at the same time have something to allocate and spend less cost to develop.

Similarly, Lakhani & Wolf (2005) in their research, using a web-based survey, found that enjoyment-based-intrinsic motivations are more significant for programmers than extrinsic benefits such as better job and career advancement, and other intrinsic motivation such as obligation/ community intrinsic motivations. Some programmers stressed more their intrinsic benefits with the two quoted examples:
'I think much of open source software begins as something that gets built by an individual to make his job easier, that he decides to feed back to the community' and 'open source is not really about communities coming together to contribute to a project. Open source is really about communities' learning and growing from shared knowledge of individuals in that community' (Krishnamurthy, 2006, pp. 32-33).

Contributing to Open Content Webpages

Nov (2007) in his study to explore reasons that motivate individuals to contribute to Wikipedia, employed Clary, et al.'s (1998) model, the Volunteer Functions Inventory (VFI). However, they adapted that model to include another two functions: Fun and Ideology. These two added functions were driven from motivational studies of open source software such as Hars & Ou (2001) and Stewart & Gosain (2006). Motivations of contribution to Wikipedia were in order: fun, ideology, value, understanding, enhancement, protective, career, and social motives. It can be argued that academics may approach Wikipedia to publish their research as disseminator of knowledge to those individuals who might not have access to print journals or expensive databases (Black, 2008). Moreover, the desire to create a public repository for knowledge can be one of the most important factors that motivate users to write to Wikipedia (Baytiyeh & Pfaffman, 2010).

Volunteering to Open Educational Resources (OERs)

Many information seekers are using the web to gain resources. Learners, too, use the internet to search and to find specific information. Now, many universities have made their courses available online. However, until recently, much of the material was locked with passwords. Open educational resources aim to enable and encourage the sharing of content for free (Johnstone, 2009). There are two types of open educational resources: open access educational resources where users can have access only to the learning materials; and open content educational resources where users can contribute to content by adding, editing, or remixing them. Open access educational resources have been initiated mainly by educational institutions such as The Open University and Yale University (Open University OpenLearn, 2010; Open Yale Courses OYC, 2010). Other open content educational resources have been initiated mainly by community and not-for-profit organizations such as OERCommons and Wikibooks (OERCommons, 2010c; Wikibooks, 2010).
In a survey published with results (OERCommons, 2010a, 2010b), learners (self-learners and students) and teachers (k-12 teachers and university instructors) are of the highest four categories of those who used OERs. Reasons given for using these learning and teaching materials include: knowledge expansion, staying current, getting ideas for and supplementing lessons, improving teaching methods, connecting with teachers or learners and completing assignments. From these, it can be deducted that teachers and learners have different reasons of using the OERs. Figure 1 distinguishes between motives for using OERs by teachers and learners:

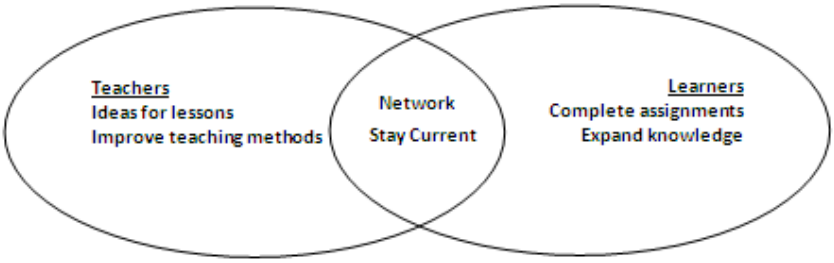

Figure 1: Reasons for the use of OERs by teachers and learners

The survey explored why those teachers and learners are *used* open educational material. However, contribution of content in the open in content educational materials remains unexplored!
Open content textbooks, such as Wikibooks (Wikibooks, 2010) have been used in educational institutions. A comparative study between students who used their course text and those who generated and contributed into their own text has shown that open content text students demonstrated greater mastery of content than ordinary text students (Kidd, et al., 2009). Aiming to explore 80 Wikibookians' experience, Sajjapanroj, Bonk, Lee, & Lin (2008) in their research used a web-based survey. Analysed responses revealed that Wikibookians perceived the wiki environment as productive, engaging, fun and successful. They were inspired to contribute and share content because this enabled them to publish their work as well as enjoying the process of knowledge sharing, personal growth, and enhancement.

Although the above Wikibookians' motivations show the unique nature of open content textbooks, those motivations were not assigned to values (or goals) to open source software or volunteering to social organizations. This appears warrant a further investigation to explore whether contributors value sharing, have the ideology that educational information should be free, want to make use of their free time, and want to help others, impact by teachers and their friends.

Method

An adapted version of the VFI was developed. This adapted version is called OERVFI and Table 1 shows the functions and examples of questions that represent these functions:

Motivation	Survey question[1]
Protective	I am lonely and I have free time
Value	Poor people can find free books
Career	I cannot find other places to publish my work
Social	My friends do so
Understanding	I contribute because I want to learn
Enhancement	Logical/grammatical errors have to be corrected
Fun	I want to have fun
Ideology	I think information should be free
Power	My teacher asked me to do so
Community oriented	There is a lack of resources in my language

Note 1: The scale ranges from 1 (strongly disagree) to 5 (strongly agree)

Table 1: 5 point Likert-type OERVFI questions

Web-based surveys have been used in much research in the field of open source software and open content (see for example Bitzer, et al., 2005; Hars & Ou, 2001; Hertel, Niedner, & Herrmann, 2003; Lakhani & Wolf, 2005; Nov, 2007; Schweik, Evans, & Grove, 2005). The web-based survey is an ideal tool for potential participants who are mostly remain unknown. Thus, it allows access to large number of

potential participants who are geographically distributed around the globe. Web-based surveys usually accompanied with email invitations that sent to discussion list and email lists. Although the web-based survey has becoming widely used in education and social science research, there are a number of concerns with this type of survey. For example, these surveys might cause a coverage bias: most users of the internet are those of young age, most participants in the survey are those who have internet access (Spitz, Niles, & Adler, 2006) and those who are better educated and are technology natives (Daley, McDermott, Brown, & Kittleson, 2003). Although these might be an issue with potential participants in the field of education, they have limited implications for the current research. Since most users of Wikibooks are understood to be those who have internet access, it is possible to use web-based survey in the current research. Moreover, the web-based survey is user-friendly (attractive colour & short) to avoid the skipping-answers problem (Kalucy, Hordacre, & Patterson, 2008; Vicente & Reis, 2010).

To understand the motivation of contribution to open educational resources, *Wikibooks* were selected, as the vehicle for open content textbooks. Invitation emails were sent to subscribers to *Wikibooks*' email list. To deal with low rates of response, a website advertisement was published on the English version of *Wikibooks*. Questions that were designed and presented in the previous table were in the form of a 5 point *Likert*-type scale from strongly agree (+2) to strongly disagree (-2). 145 responses to the survey on the English version of *Wikibooks* were received. Factor analysis is a statistical technique that is used to discover variables in a scale that form coherent sub-sets: each sub-set constitutes a factor (or a component) of which contains items that correlated with one another but independent from other components (Tabachnick & Fidell, 2007). The goal of factor analysis is to summarize the pattern of correlations between large numbers of studied variables in order to reduce them to smaller number of factors. Interpretation and naming of factors rely on the meaning of the variables of combination.

A problem with factor analysis is that there are infinite numbers of rotation, and the choice of which alternative is the best depends on the assessment of researcher of its interpretability (Tabachnick & Fidell, 2007). However, criticism of factor analysis and Varimax rotation have not prevented that these two methods to be used extensively in the field of psychology and other social sciences. For example, Green & Harvey (1983) used principal component analysis followed by Varimax rotation of factors to assess the factorial structure of attitudes toward mainstreaming. Similarly, Baytiyeh and Pfaffman (2010) used Factor Analysis followed by Factor Rotation to explore factors that motivate volunteers to contribute to Wikipedia. Moreover, Taylor (1997) extracted, by using Varimax rotation, two factors out of a long scale that measures attitudes of students toward mathematics.

Results

Factor analysis enabled four components to be extracted, followed by Varimax rotation to explore the items that were inter-correlated. The results of Varimax rotation are presented in Table2:

Scale items	Component			
	1	2	3	4
Poor people can use these free books	0.801			
I believe that information should be free	0.703			
I contribute because I want to learn	0.629			
I want to have fun	0.549			
I'm lonely and have free time		0.792		
I cannot find other places to publish my work		0.761		
My teacher asked me to do so			0.888	
My friends do so			0.807	
Logical and grammatical errors have to be corrected				0.769[1]
There is a lack of information resources in my language.				0.613

Note 1: This item is reverse coded. This suggests that those who have minor contributions (such as fixing grammatical and spelling errors) are less likely to undertake major contributions (such as adding to the content) and vice versa.

Table 2: Rotated motivations components matrix

Varimax showed that there four factors determined users' contributions to Wikibooks. These factors were named as:

1) *Rewarding* through either self-rewarding (learning & enjoyment) or others rewarding (free information & free books). Internal consistency for this subscale is: $\alpha = 0.623$
2) *Problem-solving* which includes solving the problems of loneliness and difficulties with publishing. Internal consistency for this subscale is: $\alpha = 0.558$
3) *Social imperatives* which include the teachers' impact and the friends' impact. Internal consistency for this subscale is: $\alpha = 0.675$
4) *Content-orientation* which includes contributing because of the lack of resources or poor quality content. Internal consistency for this subscale is: $\alpha = 0.157$

The means (M) and standard deviations (SD) of these four components as well as their internal consistency coefficients (α) are presented in Table 3:

Factor	Mean (M)	SD	Reliability (α)
Content-orientation	3.39	0.60	0.157
Rewarding	1.1	0.62	0.623
Problem-solving	-0.47	0.92	0.558
Social imperatives	-1.04	0.95	0.675

Table 3: Means and alpha level of the factors

From Table 3, it can be concluded that individuals contributed mainly to open content textbooks, such as Wikibooks, for rewarding themselves as well as pay-back to others (M= 1.1, SD= 0.62). However, although content orientation's mean score is 3.39 and SD is 0.60, its low internal consistency ($\alpha = 0.157$) makes this factor unsuitable for further consideration as a reason for contribution. The negative mean scores for both problem solving (M= -0.47, SD= 0.92) and social imperative (M=-1.04, SD= 0.95) indicate that contributors wrote to Wikibooks because they had problems; and by contribution, their problems would be solved; and they wrote because of impacts from others, whether teachers or friends. With a closer look at the rewarding factor that appears in component 1 in Table 2, the arrangement of the reasons according to their means (from the highest to lowest) is illustrated in Table 4:

Motivation	Mean	SD
Ideology: information freedom	1.53	0.80
Understanding: learning	1.28	0.79
Value: helping others	0.97	0.98
Enjoyment: Fun	0.62	1.02

Table 4: Means and standard deviations of the items included in rewarding factor

Discussion

This study aimed to uncover reasons that inspired contributors to write to open educational resources. One of the most common and rapidly expanding OERs is Wikibooks. An adapted version of the six functions (protective, value, career, social, understanding and enhancement) included in Clary, et al.'s (1998) Volunteer Functions Inventory (VFI) in addition to another two functions (ideology & fun) from Nov' (2007). Furthermore, the OERVFI included a further two functions (power and community-orientation) that were commonly found in open content and open software literature. Thus the OERVFI included ten functions which were protective, value, career, social, understanding, enhancement, fun, ideology, power, community orientation.

Nov (2007) has found that most contributors to Wikipedia were largely motivated by fun followed by ideology, values, and understanding (for the top four). Other motivations are enhancement, protective, career and social. Although the current study has shown a different order (ideology, understanding, value

and fun) slightly different from Nov's (2007) top four motivations, the top four motivations of the current study replicated the Nov's (2007) top four motivation.
Moreover, the results of the current study contradict with what Hertel, et al.'s (2003) findings: in their research Hertel, et al. (2003) found that hedonistic motives (enjoyment) was highest motivation (M=4.8) followed by the pragmatic motives of enhancing Linux (M= 4.3), political motives of supporting OSS (M= 4.1) and norm-oriented motives for those who desired to define themselves as members of community (M= 3.9). The pragmatic motives involve learning while the social/political motives involve kinds of helping and supporting the community; while the pragmatic motives, in a sense, involve an ideology of promoting the software freedom. The four motivations emerging from this study, while in a different order, replicated the same motivations in open source software, as Hertel, et al. (2003) have found.

Although Lakhani & Wolf (2005) have differentiated motivations into enjoyment-based intrinsic motivation, extrinsic-based motivation and community-based intrinsic motivation, each group contained detailed sub-motivations. They represented each motivation by the percentages of participants who agreed on that specific motivation. The Lakhani & Wolf's (2005) top four were intellectually stimulating (46.1%), improve programming skills (45.8%), source should be open (34.8%) and personal obligation to contribute to F/OSS (29.6%). These top four percentages appear to be similar to the current study's findings, although in a different order, in terms of enjoyment, learning, ideology and value.

The finding that the rewarding motivation (which include learning, enjoyment, making free knowledge happen, and helping others with free books) is similar to what Sajjapanroj, et al. (2008) have found: Sajjapanroj, et al. (2008) found that learning and sharing inspirations were the highest inspirations (78%). Another interesting result of the current study was that publishing inspirations did not motivate users to contribute to Wikibooks; this result contradicts Sajjapanroj, et al.'s (2008) finding who found that Wikibookians contributed because they wanted to publish their work.

The big four motivations (information freedom, understanding and learning, helping other, and enjoyment) have significant implications for education providers and OER initiatives. Freedom of information shows that the net generation does not only search for free information but also share information with others in mutual-benefit relationship. This net generation has grown up in more democratic societies where access to information is relatively unlimited and learning resources have expanded beyond traditional forms of education providers. Thus, it is advisable that educational institutions speed up the transition toward open educational resources. Moreover, the net generation is not individualistic as commonly described, since the forms they socialise in have changed (Facebook and Online Messengers are examples). They are also motivated to help others not in the form of providing consumer goods but rather in the form of productive goods (information and learning resources). Enjoyment is a very significant issue in any internet (human-machine) interactivity, and it would be advisable to education providers and OER initiatives to integrate online communication features that provide various methods of enjoyment to members of the net generation club.

Future Research

This study has revealed four dimensions: rewarding, content orientation, problem solving, and social imperatives, as reasons given by respondents for contribution to open textbooks. Rewarding was the strongest reason for contribution. While Sajjapanroj, et al. (2008) found that publishing was one of the main reasons for contribution, this study showed that this is not only the case. Indicated here may be a problem of coverage bias in the current study. In other words, it might be concluded that most participants of the survey were learners whose significant aims in interacting with open texts were to learn and to share information with others. As a further caution in interpreting the current data, and like in other studies in psychology and social science, the current research depends on participants' self-reporting experience, which may not reflect accurately all motivation for contribution. It is also important to consider that learners and teachers might work together on the same content, though their motivations may actually differ.

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